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| 09/990,049      | 11/21/2001  | William Ford         | 450117-03449        | 1484             |

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EXAMINER

NAFF, DAVID M

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1651

DATE MAILED: 09/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application N .

09/990,049

Applicant(s)

FORD ET AL.

Examiner

David M. Naff

Art Unit

1651

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 November 2001 .
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All   b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_ .
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) FILED 11 .                      6) ☐ Other: \_\_\_\_\_ .

Art Unit: 1651

The preliminary amendment of 11/21/01 amended claims 3-9, 11-14, 16-18, 20 and 23, and added new claim 24.

Claims examined on the merits are 1-24 which are all claims in the application.

### **Specification**

The disclosure is objected to because of the following informalities: the specification fails to contain headings designating different sections.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

### **Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
- (e) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (f) BRIEF SUMMARY OF THE INVENTION.
- (g) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (h) DETAILED DESCRIPTION OF THE INVENTION.

Art Unit: 1651

- (i) CLAIM OR CLAIMS (commencing on a separate sheet).
- (j) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (k) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A  
"Sequence Listing" is required on paper if the application  
discloses a nucleotide or amino acid sequence as defined in  
37 CFR 1.821(a) and if the required "Sequence Listing" is  
not submitted as an electronic document on compact disc).

The following suggestions are made.

Page 1,

Above the first paragraph insert ---

FIELD OF THE INVENTION

---

Between the first and second paragraphs insert ---

BACKGROUND OF THE INVENTION

---

Page 3, above the last paragraph insert --

SUMMARY OF THE INVENTION

--

Page 7, below the second full paragraph insert --

BRIEF DESCRIPTION OF THE DRAWINGS

(Insert the description of the drawings from page 13, last  
paragraph to page 15, second paragraph, and cancel from page 13, fifth  
paragraph to page 15, second paragraph)

DETAILED DESCRIPTION OF THE INVENTION

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Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

Claims 1-24 are rejected under 35 U.S.C. 112, second paragraph,  
as being indefinite for failing to particularly point out and  
distinctly claim the subject matter which applicant regards as the  
5 invention.

The claims are confusing and unclear by failing to set forth  
clear, distinct and positive steps using language that is definite AS  
to meaning and scope.

In line 2 of claim 1 and where recited in any other claims  
10 "nucleic acid specific metal complex" is uncertain as to meaning and  
scope since it is unclear as to how one would know when a metal  
complex is specific and not specific to a nucleic acid. The term  
"metal complex" is further uncertain as to meaning and scope in being  
unclear as to what is required in addition to the metal by reciting  
15 "complex". It would be uncertain as when a metal is a complex and not  
a complex.

In the second paragraph of claim 1, there is not antecedent basis  
for "non-conjugated metal complex and/or non-conjugated by-products".  
These should be required to be produced when the metal complex is  
20 reacted with the nucleic acid. Additionally, the second paragraph of  
claim 1 fails to set forth positive process steps. The steps should  
require "removing" and "reacting" rather than steps reciting "are  
removed" and "is reacted". This applies to other claims involving  
similar situations.

Claim 2 is unclear as to when in the process of claim 1 the nucleic acid is reacted as required in claim 2. Additionally, in line 1 of claim 2 and where recited in other claims "characterized in that" should be replaced with "comprising", "further comprising" or  
5 "wherein", whichever is appropriate, to be consistent with reciting "comprising" in line 1 of claim 1.

In line 3 of claim 2 and where recited in other claims, "e.g." followed by an example of a material, condition or step is confusing since it is uncertain as whether the invention is to be patentably  
10 limited by the recited example.

In line 2 of claim 3 and where recited in other claims "selected from the group comprising" is improper Markush language and should be changed to read "selected from the group consisting of". Additionally, in lines 3-5 of claim, the meaning of "A-DNA", "B-DNA",  
15 "Z-DNA", "T-junctions of nucleic acids", "triplexes of nucleic acids", "quadruplexes of nucleic acids", and "domains of non-nucleic acid polymer-nucleic acid block-copolymers" is uncertain. If these terms are known in the prior art and have an art recognized meaning, this should be established by evidence.

20 Claim 5 is unclear how metalation and/or inter active ligand binding are used in the process of claim 1 to form the conjugate. It is unclear as to additional steps claim 5 requires and how these steps are used in combination with the steps of claim 1. Furthermore, the

Art Unit: 1651

terms "metalation" and "inter active ligand binding" are uncertain as to meaning and scope.

Claim 6 is unclear as to what are "specific bases of the nucleic acid" how these bases are "metalated" in claim 1. Is claim 6  
5 requiring additional steps in claim 1 or merely further defining the nucleic acid in claim 1?

In lines 3 and 4 of claim 7, "metal complexes with attached or intergrated nucleic acid interacting groups", like intercalating, groove binding and alkylating agents" is uncertain as to meaning and  
10 scope. What is the difference in "attached" and "intergrated" groups. Additionally, how does "like intercalating, groove binding and alkylating agents" relate to the metal complexes, and patentably limit the metal complexes. Reciting "like" leads to uncertainty as to meaning and scope since being "like" is relative and subjective.  
15 Furthermore, the meaning of "intercalating" and "groove binding" is uncertain. If these terms are used in the prior art and have an art recognized meaning, this should be established by evidence.

In line 4 of claim 9, reciting "L can be" is confusing. L must be something and the claim should recite "L is". It is uncertain as  
20 to the type of compound present when L is "ether" and "H<sub>2</sub>". Are all of the compounds recited after "amine" in 4 intended to be L or are they different reducing agents unrelated to L. The claim should be clear as to which compounds are L and which are not.

Art Unit: 1651

In line 2 of claim 11, "consisting" should be inserted after "group", and in line 3 "or" should be changed to "and" to set forth a proper Markush group. In line 3 of the claim, reciting a portion of the claim in parenthesis makes unclear as to whether the portion in parenthesis is patentably limiting. The recital of "e.g." to denote an example has been commented on above.

Claim 12, bridging lines 1 and 2, is unclear, as to the meaning and scope of "metal nanoparticle is catalytically active towards electroless metallisation". It is uncertain how the nanoparticle functions when catalytically active, and how one would know when the nanoparticle is catalytically active and not catalytically active.

Claim 13 is confusing by reciting "and/or" since when "or" is recited, this encompasses the nanoparticle being less than 3nm and being visualized by atomic force microscopy, or the converse.

In line 2 of claim 14, the meaning of "elctroless" is uncertain.

The type of comments set forth above in regard to claim 11 and the recital of "comprising" in a Markush group also apply to claims 16 and 17. Additionally, in line 3 of claim 17 reciting "and/or" is confusing since this encompasses the metal being both "magnetic" and "magnetized". In line 4 of the claim it is uncertain as to what "B" and "P" represent.

Reciting "obtainable" in line 1 of claim 18 is confusing since if the composite is not obtained by the process of claim 1 it is



Art Unit: 1651

uncertain as to the process it is obtained from since no other process is described in the specification.

The comments set forth above in regard to claim 13 also apply to claim 19.

5        Claims 20 and 23 are unclear and improper dependent claims by depending on multiple claims that are not alternative. Additionally, reciting "preferably" makes unclear as to whether the preferred condition is to be patentably limiting.

10        The recital of "obtainable" in claim 21 is confusing for the reason set forth in regard to claim 18. Furthermore, requiring forming a "linear array of metallic nanoparticles" according to the method of claim 20 is confusing since claim 20 is drawn to producing only a nanowire.

15        Claim 23 provides for the use of a process according to claim 1, but, since the claim does not set forth any steps involved in the method/process of use, it is unclear what method/process of use applicant is intending to encompass. A claim is indefinite where it merely recites a use without any active, positive steps delimiting how this use is actually practiced.

20        Claim 23 is rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, results in an improper definition of a process, i.e., results in a claim which is not a proper process claim under 35 U.S.C. 101. See for example *Ex parte Dunki*, 153 USPQ 678 (Bd.App. 1967) and

*Clinical Products, Ltd. v. Brenner*, 255 F. Supp. 131, 149 USPQ 475  
(D.D.C. 1966).

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35  
5 U.S.C. 102 that form the basis for the rejections under this section  
made in this Office action:

A person shall be entitled to a patent unless -

10 (a) the invention was known or used by others in this country, or patented or described  
in a printed publication in this or a foreign country, before the invention thereof by  
the applicant for a patent.

Claims 1-9, 11-16 and 18-23 are rejected under 35 U.S.C. 102(a)  
as being anticipated by Richter et al (AQ) or Pompe et al (AR).

The claims are drawn to a process of producing a metal  
15 nanoparticle-nucleic composite by reacting a nucleic acid with a metal  
complex to produce a metal complex-nucleic acid conjugate, removing  
non-conjugated byproducts, and reacting the conjugate with a reducing  
agent. Also claimed is a composite resulting from the process, a  
process of making a nanowire by treating the composite by electroless  
20 deposition of metal, and a nanowire resulting from the process.

Richter et al and Pompe et al disclose processes of reacting a  
nucleic acid with a metal complex to produce a conjugate, removing by-  
products, and reducing the conjugate to produce a metal nanoparticle-  
nucleic acid composite and a nanowire. Clusters are obtained of 3 to  
25 5 nm in diameter. For example, see Richter et al (page 508 and 510)  
and Pompe et al (page 1089, under "Metallization of DNA-Preparation of  
'Smart' Nanowires").

Art Unit: 1651

The processes of Richter et al and Pompe et al and resultant products are the same as presently claimed. The processes of the present claims do not contain conditions or steps that exclude forming clusters as disclosed by Richter et al and Pompe et al. Furthermore, the present specification is unclear as to conditions and/or steps used that are different than used by Richter et al and Pompe et al to not form clusters. Clusters of 3 nm diameter would not appear to be visualized by atomic force microscopy. Additionally, metal nanoparticles in the clusters would appear to be less than 3 nm diameter since the clusters are made up of more than one metal nanoparticle.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

15 (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

20

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of

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Art Unit: 1651

each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5        Claims 1-9, 11-16 and 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Richter et al or Pompe et al.

The invention and Richter et al and Pompe et al are described above.

10        In claims 13 and 19, an alternative requires metal nanoparticles to have a diameter of less than 3 nm.

Richter et al and Pompe et al disclose that cluster size depends on the time of metallization. See Richter et al (page 508, right col, first complete paragraph) and Pompe et al (page 1090, top section of the right col).

15        It would have been a matter of individual preference and obvious to control the metallization time in the processes of Richter et al and Pompe et al to obtain clusters of less than 3 nm diameter.

***Claim Rejections - 35 USC § 103***

20        Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1-9, 11-16 and 18-23 above, and further in view of Singh et al (5,560,960) and Newsman et al (5,670,680).

The claim requires a gaseous reducing agent.

Singh et al disclose using hydrogenation (col 4, line 57) for reducing metal ions to produce metals in a process of producing metal nanoparticles by electroless plating.

Newman et al disclose using hydrogen gas for hydrogenation in  
5 producing metal complexes.

It would have been obvious to use hydrogen gas as the reducing agent of Richter et al and Pompe et al as suggested by Singh et al and Newman et al.

***Claim Rejections - 35 USC § 103***

10 Claims 17 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claims 1-9, 11-16 and 18-23 above, and further in view of Singh et al.

Claim 17 requires the metal of the composite to be iron, cobalt or nickel, and claim 24 is producing a nanowire using metal of claim  
15 17.

Singh et al disclose (col 5, line 18) using cobalt, nickel or iron when producing metal nanoparticles by electroless plating.

It would have been obvious to use as the metal of Richter et al and Pompe et al the metals taught by Singh et al since these metals  
20 would have been expected to function as desired by Richter et al and Pompe et al when carrying out electroless plating to produce metal nanoparticles and nanowires.

***Double Patenting***

The nonstatutory double patenting rejection is based on a  
25 judicially created doctrine grounded in public policy (a policy

Art Unit: 1651

reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 5 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-24 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 and 24-35 of copending Application No. 10/210,812. Although the conflicting claims are not identical, they are not patentably distinct from each other because the presently claimed processes and resultant products would have been obvious from the process claimed by the copending application of metallization of a nucleic acid to produce a metal nanoparticle-nucleic acid composite.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David M. Naff whose telephone number is 703-308-0520. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Wityshyn can be reached on 703-308-

Application/Control Number: 09/990,049

Page 14

Art Unit: 1651

4743. The fax phone number for the organization where this application is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone

5 number is 703-308-0196.



David M. Naff  
Primary Examiner  
Art Unit 1651

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DMN  
9/12/03